SDSU OIV Activities

By
Dennis Helder

Landsat Science Team Meeting

Landsat 8 Launch!!

February 12, 2013

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SDSU OIV Activities

- OIV: On-orbit Initial Verification
  - 90 day period
  - First 30 days focus on spacecraft
  - Last 60 days emphasis on instruments
    - Nominally March 11 through May 11

SDSU OIV Activities

- **Relative Gains (OLI/TIRS)**
  - Histogram Statistics
  - Yaw maneuver
  - Striping
- **SCA-SCA Discontinuities (OLI/TIRS)**
- **Absolute Calibration (OLI)**
  - Vicarious field campaigns
  - L7 Underfly
  - Pseudo Invariant Calibration Sites (PICS)

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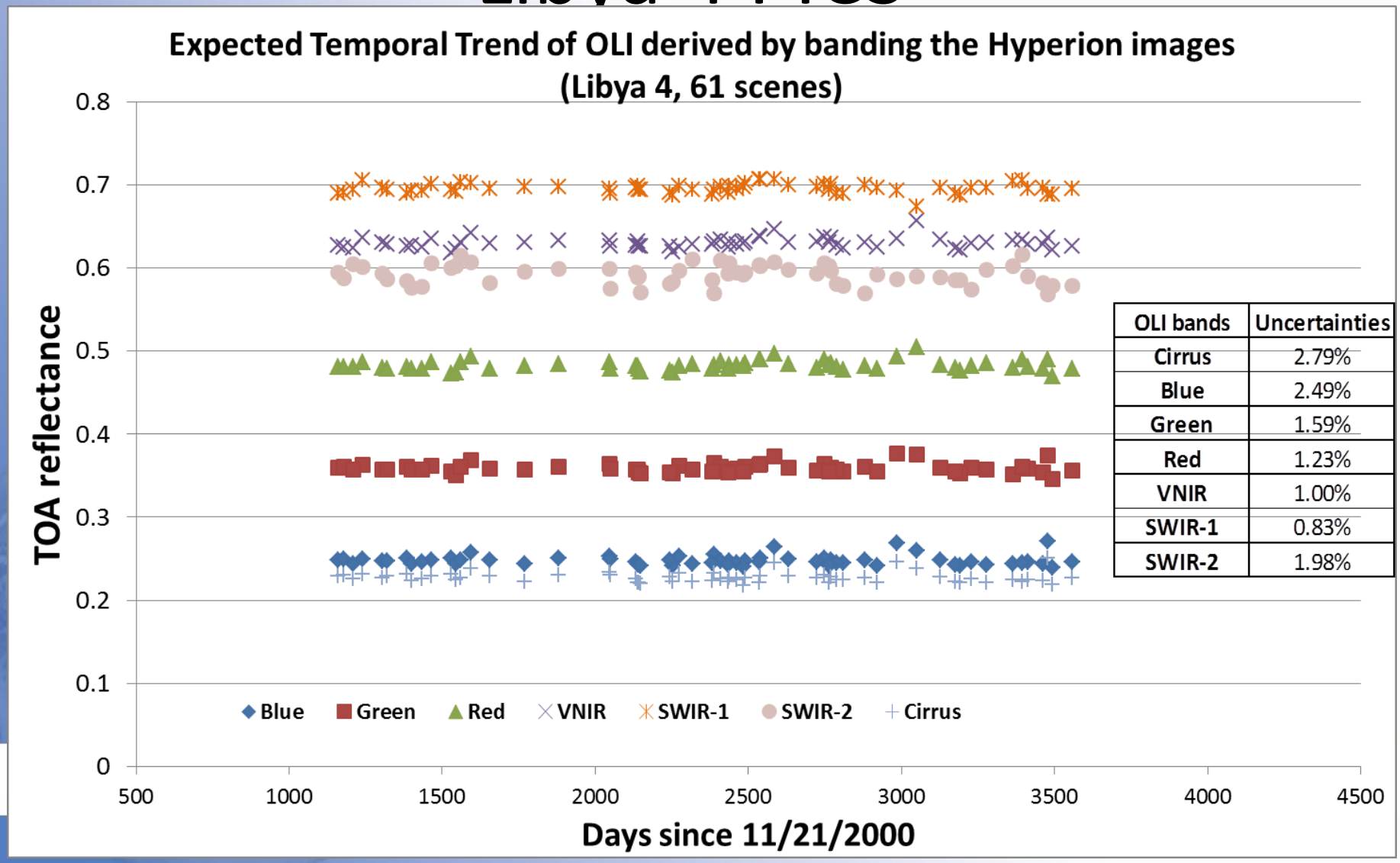
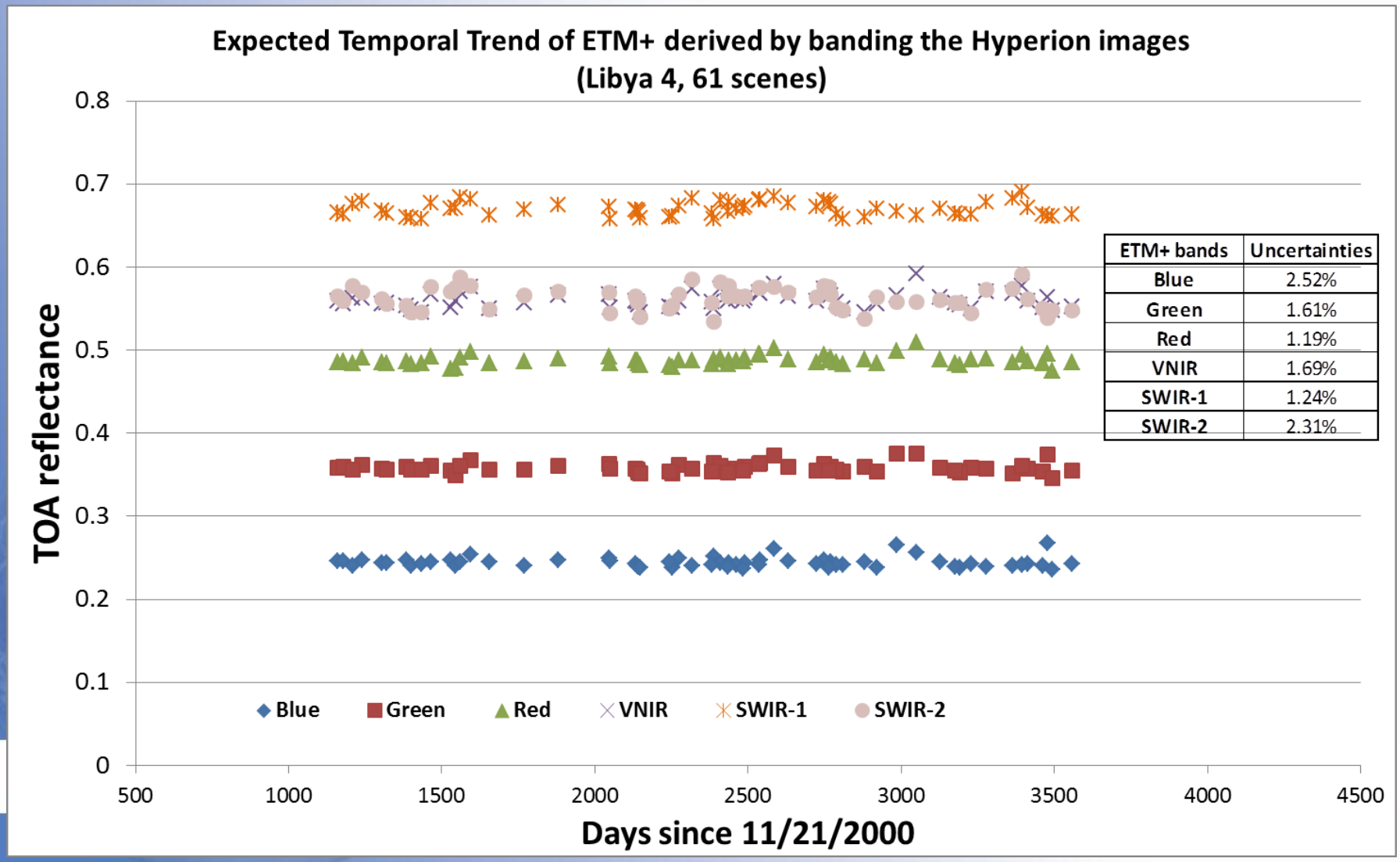
Simulation of OLI Observations of Libya 4 PICS



OLI bands	Uncertainties
Cirrus	2.79%
Blue	2.49%
Green	1.59%
Red	1.23%
VNIR	1.00%
SWIR-1	0.83%
SWIR-2	1.98%

Landsat 7 ETM+ Simulated Observations of Libya 4



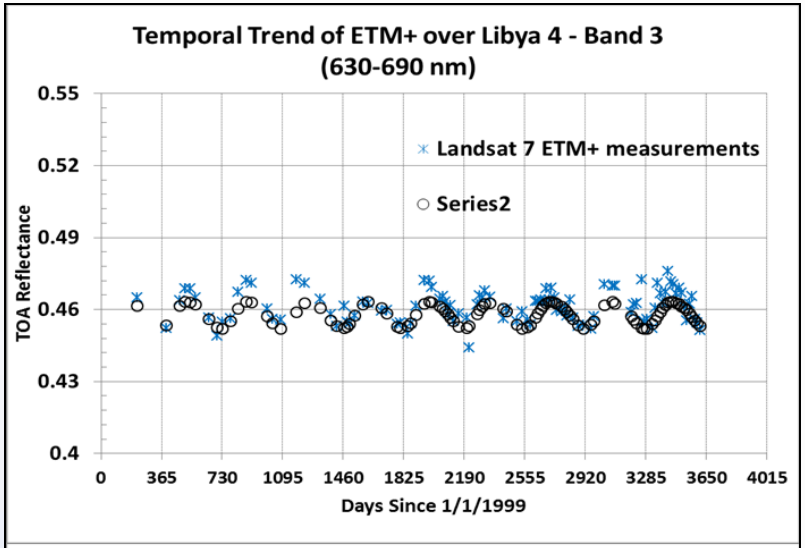
Simulation Comparison between ETM+ and OLI

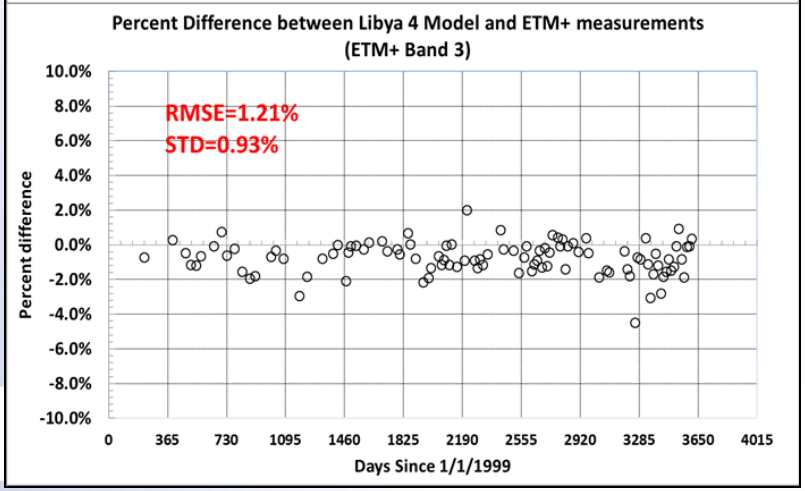
Bands	Avg. Reflectance		Uncertainties	
	ETM+	OLI	ETM+	OLI
Blue	0.244	0.248	2.52%	2.49%
Green	0.358	0.359	1.61%	1.59%
Red	0.488	0.483	1.19%	1.23%
VNIR	0.561	0.630	1.69%	1.00%
SWIR-1	0.670	0.695	1.24%	0.83%
SWIR-2	0.562	0.592	2.31%	1.98%

- Because of the difference in RSRs, higher values of TOA reflectance are estimated by OLI bands in Libya 4, particularly at longer wavelengths
- Additionally, the uncertainties at longer wavelengths will be substantially reduced due to avoidance of atmospheric absorption features.

Absolute Calibration: PICS-based model

- Absolute calibration can be performed by anchoring trends using a calibrated source or detector
- An empirical model was developed using Hyperion for spectral coverage and anchoring using Terra MODIS. Illumination and viewing geometries, BRDF, and atmospheric corrections were modeled.
- Validation was performed using Landsat 7 with accuracies of ≤2% in the VNIR and ~5% in the SWIR.





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OLI Absolute Calibration Uncertainty Using Libya 4 During OIV

- Assume 3 observations of Libya 4 possible during OIV
- Estimate uncertainty from 3 observations based on historical observations
- Type A (random) error in table below; Type B (systematic) error ~3% based on Terra MODIS

Bands	Uncertainty	1 σ
Coastal Aerosol	1.54%	1.06%
Blue	1.03%	0.64%
Green	1.20%	0.78%
Red	0.72%	0.42%
VNIR	0.50%	0.22%
SWIR-1	0.39%	0.22%
SWIR-2	1.26%	0.76%

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Summary/Conclusions

- Calibration of OLI using PICS—expecting greater precision both long term (lifetime) and short term (OIV)
- Next 90 days will be exciting! …and busy
- Imperative for this team to do two things:
  - Clearly proclaim the value of the Landsat mission
  - Provide solid science input to the long term requirements of the Landsat mission

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